查询RX703000供应商

User's Manual

NEC

RD850

Task Debugger (Windows™ Based)

Target Devices
V850 Family™
Target Real-Time OS
RX850 Ver. 3.13
Target Task Debugger
RD850 Ver. 3.01

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Major Revisions in This Edition

Page	Description
p.14	Addition of supported host machine OS in **1.3 Operating Environment**
p.15	Modification of explanation in **2.1 Installation**
p.15	Modification of explanation in **2.2 Directory Configuration**
p.45	Addition of **APPENDIX B REVISION HISTORY**

The mark ⋆ shows major revised points.

INTRODUCTION

Target readers

This manual is intended for users who design and develop application systems using V850 Family products.

Purpose

This manual describes the functions of the RD850, following the organization listed below.

Organization

This manual consists of the following major sections.

- General
- Installation and startup method
- Window reference
- Error messages
- Cautions

How to read this manual

It is assumed that the readers of this manual have general knowledge in the fields of electrical engineering, logic circuits, microcontrollers, C language, and assemblers.

To understand the hardware functions of the V850 Family
→ Refer to the **User's Manual Hardware** of each product.

To understand the instruction functions of the V850 Family
→ Refer to the **V850 Family User's Manual Architecture (U10243E)**.

Conventions

Data significance:	Higher digits on the left and lower digits on the right
Note:	Footnote for item marked with **Note** in the text
Caution:	Information requiring particular attention
Remark:	Supplementary information
Numeric representation:	Binary...XXXX or XXXXB
	Decimal...XXXX
	Hexadecimal...0xXXXX

Prefixes indicating power of 2 (address space, memory capacity):

K (kilo)	$2^{10} = 1024$
M (mega)	$2^{20} = 1024^2$

Related Documents Read this manual together with the following documents.

The related documents indicated in this publication may include preliminary versions. However, preliminary versions are not marked as such.

Documents related to development tools (user's manuals)

Document Name		Document Number
IE-703002-MC (In-circuit emulator for V851™, V852™, V853™, V854™, V850/SA1™, V850/SB1™, V850/SB2™, V850/SV1™)		U11595E
IE-703003-MC-EM1 (Peripheral I/O board for V853)		U11596E
IE-703008-MC-EM1 (Peripheral I/O board for V854)		U12420E
IE-703017-MC-EM1 (Peripheral I/O board for V850/SA1)		U12898E
IE-703037-MC-EM1 (Peripheral I/O board for V850/SB1, V850/SB2)		U14151E
IE-703040-MC-EM1 (Peripheral I/O board for V850/SV1)		U14337E
IE-703102-MC (In-circuit emulator for V850E/MS1™)		U13875E
IE-703102-MC-EM1, IE-703102-MC-EM1-A (Peripheral I/O board for V850E/MS1)		U13876E
IE-V850E-MC (In-circuit emulator for V850E/IA1™), IE-V850E-MC-A (In-circuit emulator for V850E1 (NB85E core), V850E/MA1™)		U14487E
IE-V850E-MC-EM1-A (Peripheral I/O board for V850E1(NB85E core))		To be prepared
IE-850E-MC-EM1-B, IE-V850E-MC-MM2 (Peripheral I/O board for V850E1(NB85E core))		U14482E
IE-703107-MC-EM1 (Peripheral I/O board for V850E/MA1)		U14481E
IE-703116-MC-EM1 (Peripheral I/O board for V850E/IA1)		To be prepared
V800 Series™ Development Tool Application Note Tutorial Guide Windows Based		U14218E
CA850 (C Compiler Package)	Operation Windows Based	U14568E
	C Language	U14566E
	Project Manager	U14569E
	Assembly Language	U14567E
ID850 (Ver. 1.31) (Integrated Debugger)	Operation Windows Based	U14580E
SM850 (Ver. 2.20) (System Simulator)	Operation Windows Based	U14782E
RX850 (Real-Time OS)	Basics	U13430E
	Installation	U13410E
	Technical	U13431E
RX850 Pro (Real-Time OS)	Fundamental	U13773E
	Installation	U13774E
	Technical	U13772E
RD850 (Task Debugger)		This manual
RD850 Pro (Task Debugger)		U13916E
AZ850 (System Performance Analyzer)		U14410E
PG-FP3 (Flash Memory Programmer)		U13502E

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CHAPTER 1 GENERAL

1.1 Functional Outline

The RD850 consists of a debugger and TIP[Note 1], and provides powerful debugging functions for applications that use the RX850.

The RD850 provides the following functions.

- RTOS[Note 2] resource display function
- RTOS status change function

Notes 1. TIP: Tool Interface Protocol

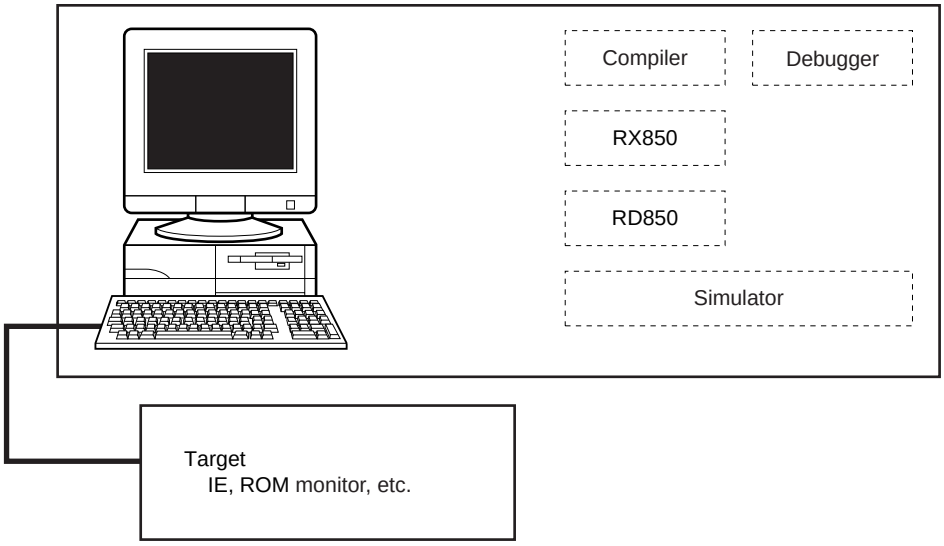
2. RTOS: Real-Time Operating System

1.2 System Configuration

The RD850 consists of a debugger and TIP, which extends the debugger functions.

The system configuration of the RD850 is as follows.

Figure 1-1. RD850 System Configuration



1.3 Operating Environment

A debugger environment is required to use the RD850. The operating environment of the RD850 is described below.

- Host Machine
  CPU: Pentium™ 100 MHz or faster
  Memory: 32 MB or more
★ OS: Windows 95, Windows 98, or Windows NT™ 4.0
- Software
  Compiler: CA850 (from NEC)
  CCV850 (from Green Hills Software™, Inc.)
  Debugger: TIP-compatible debugger
  SM850, etc.

1.4 Input Format

1.4.1 Numerical values

Octal numbers, decimal numbers, and hexadecimal numbers can be input.

Octal: 0 [0-7] +
Hexadecimal: 0 [xX] [0-9a-fA-F] +
Decimal: Other than above

The range of numerical values that can be input is as follows.

Octal: 0 ≤ Numerical value ≤ 037777777777
Hexadecimal: 0x0 ≤ Numerical value ≤ 0xffffffff
Decimal: -2147483648 ≤ Numerical value ≤ 4294967295

1.4.2 Symbols

Global symbols of assembly language level are used. Usable characters depend on the language processing system.

1.5 Symbol Display

Entry address symbols are displayed as Detailed Display area task and cyclic startup handler symbols, but if symbols do not exist, the entry address is display in hexadecimal notation.

CHAPTER 2 INSTALLATION AND STARTUP

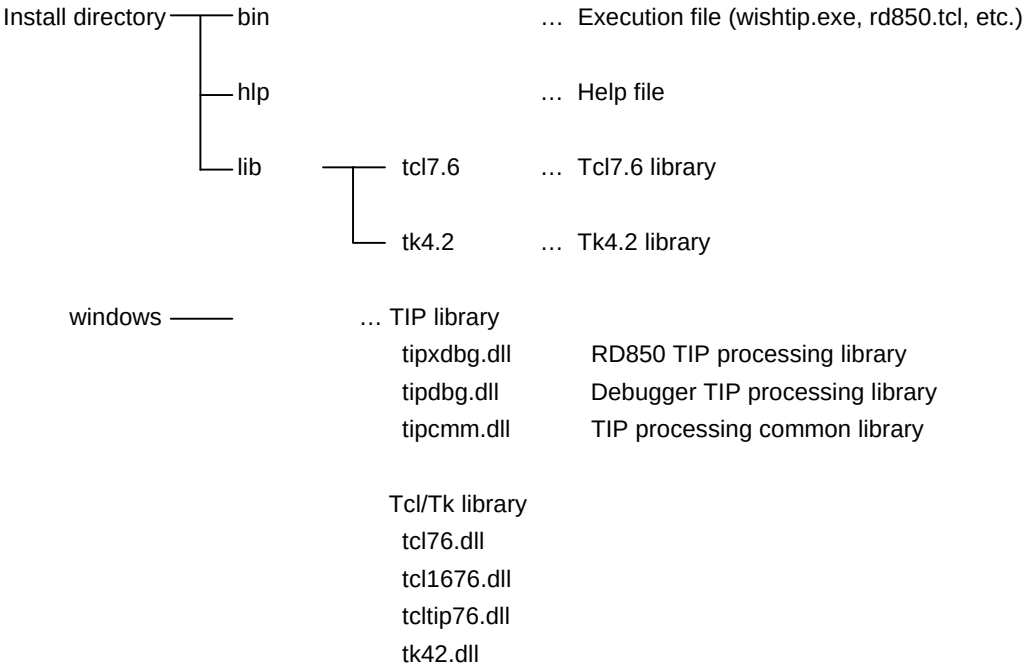
★ 2.1 Installation

This section describes the RD850's installation procedure.

(1) Start up Windows.
(2) Start up the installation program in the RD850's release media. Use either of the following installation programs.
  Japanese: setup_j.exe
  English: setup_e.exe
(3) Perform the setup procedure by following the messages displayed on the screen.

★ 2.2 Directory Configuration

After installing the RD850, the configuration of the directory related to the RD850 is as follows.



Because the RD850 is included in the RX850 object release package, the RX850 installer is used for installation. For the details of the installation procedure, refer to **RX850 User's Manual Installation (U13410E)**.

2.3 Starting the Debugger

The RD850 is described using the Tcl/Tk script language. Therefore, the RD850 itself is not an execution file. Moreover, since the RD850 operates while communicating with the debugger, it requires a Tcl/Tk that includes a communication mechanism. This expanded Tcl/Tk is called wishtip (file name:wishtip.exe). The RD850 is interpreted and executed using wishtip.

There are two methods to start up the RD850.

(1) Startup using startup parameter of wishtip
(2) Double clicking icon after linking with wishtip

The operation is the same with either of these startup methods, but method (2) is recommended because it is the simpler of the two. For the linking method, see the Windows manual.

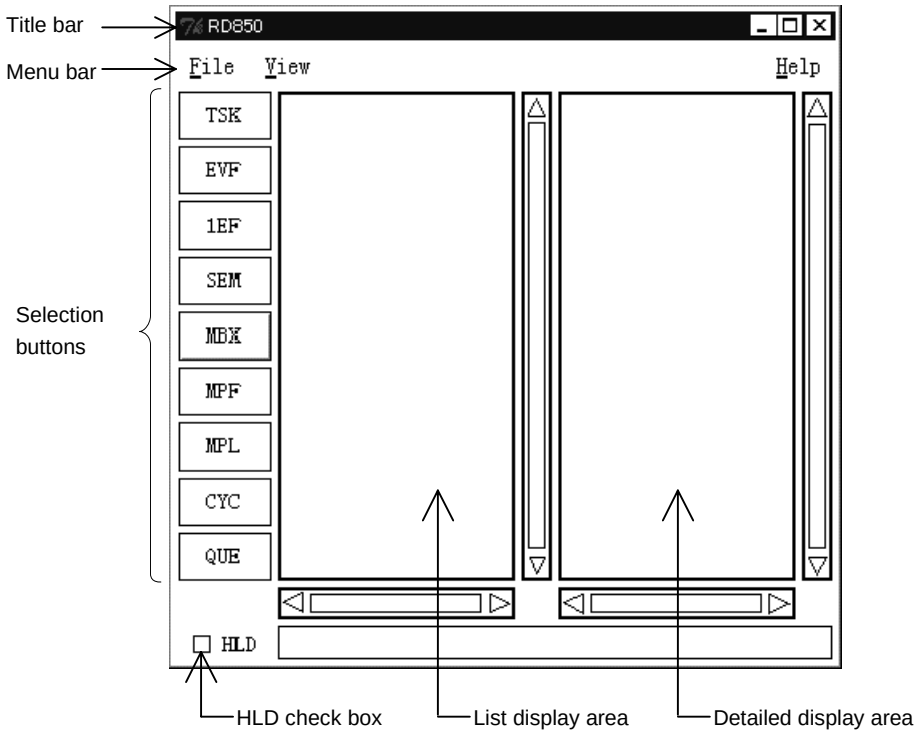
CHAPTER 3 WINDOW REFERENCE

The RD850 is started up with the startup methods described in section **2.3 Starting the Debugger**.

However, it cannot be used just on its own. The RD850 operates by collecting information via the debugger, so it must operate at the same time as the debugger. For the operation of the debugger, refer to the **ID850 (Ver. 2.20) Integrated Debugger User's Manual Operation (Windows Based) (U14580E)**.

When the RD850 starts up, the following window appears.

Figure 3-1. Resource Information Display Window



At this time, the RTOS resource information, etc., is not displayed.

3.1 List Display

To display resource information, click the buttons lined up on the left side of the window.

There are nine buttons lined up vertically. By pressing them, it is possible to display tasks, event flags, 1-bit event flags, semaphores, the mailbox, fixed length memory pool, variable length memory pool, cyclic startup handler, and system queue information.

However, the following conditions are required to display this information.

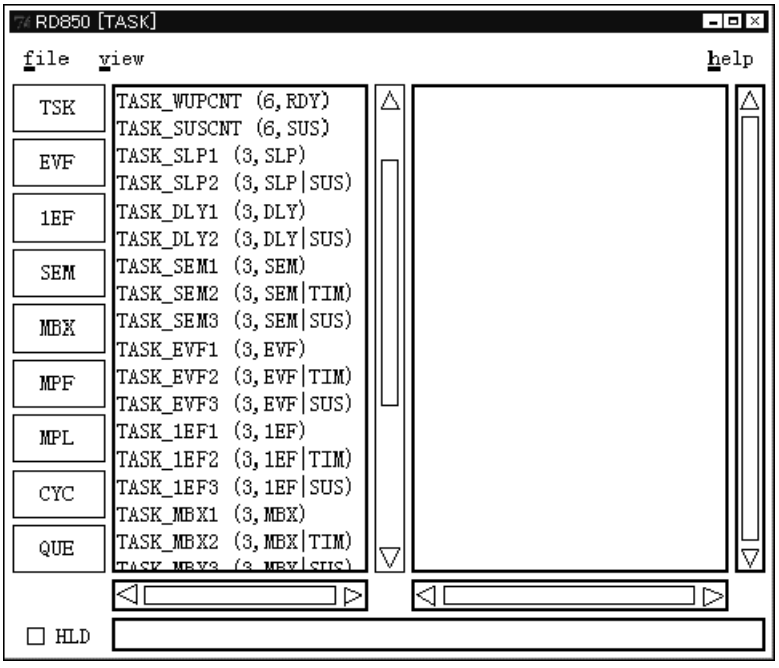
(1) The application linking the RX850 to the debugger must be loaded.
(2) OS initialization must complete.

Remark (2) is no problem if control is transferred to the task that operates first.

The operation is not guaranteed if selection buttons are pressed while these conditions are not satisfied.

A task information example is shown below.

Figure 3-2. Example of Resource Information Display Window Display



A list of the resources corresponding to the pressed button is displayed as shown in Figure 3-2.

3.2 Detailed Display

At the debug stage, resource lists are required, as is detailed resource information. In this case, click the resource for which you want to display detailed information. When a resource is clicked, the detailed information for that resource is displayed in the right area of the window.

Figure 3-3. Detailed Display

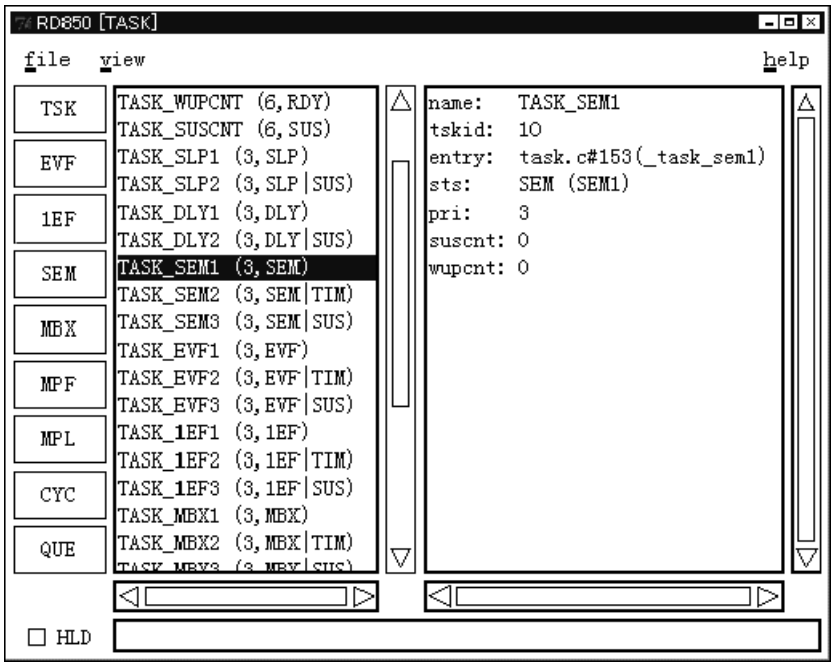


Figure 3-3 shows an example of tasks, but the operation is the same for all other resources.

3.3 Display Fixing

The HLD check box at the lower left corner of the window is a switch that fixes the status currently displayed. Normally, it is OFF.

When the HLD check box is set to ON, the display information is not updated until the check box is set to OFF again, regardless of whether program execution or breaks occur thereafter. By using this function, statuses at different times can easily be compared by starting up several RD850.

3.4 Title Bar

The title bar shows the type of resource currently selected. The title format is as follows.

RD850 [Resource Type]

3.5 Selection Buttons

The RD850 has the following buttons.

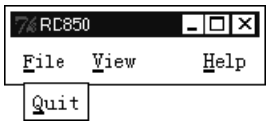
Table 3-1. Description of Selection Buttons

Button	Description
TSK	Shows task information
EVF	Shows event flag information
1EF	Shows 1-bit event flag information
SEM	Shows semaphore information
MBX	Shows mailbox information
MPF	Shows fixed length memory pool information
MPL	Shows variable length memory pool information
CYC	Shows cyclic startup handler information
QUE	Shows system queue (timer queue, ready queue)
☐ HLD	Switches between Hold/Active.

3.6 Menu Bar

3.6.1 File menu

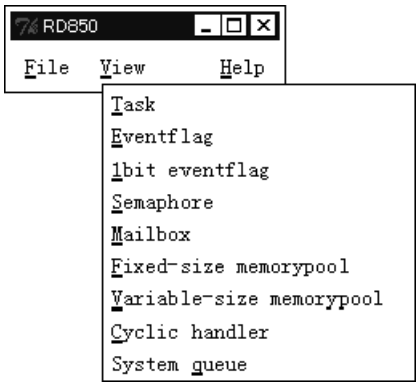
The file menu consists of the following items.



Quit Closes the RD850.

3.6.2 View menu

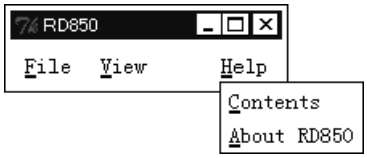
The view menu consists of the following items.



Task	Shows task information
Eventflag	Shows event flag information
1bit eventflag	Shows 1-bit event flag information
Semaphore	Shows semaphore information
Mailbox	Shows mailbox information
Fixed-size memorypool	Shows fixed length memory pool information
Variable-size memorypool	Shows variable length memory pool information
Cyclic handler	Shows cyclic startup handler information
System queue	Shows the system queue (timer queue, ready queue) information

3.6.3 Help menu

The help menu consists of the following items.

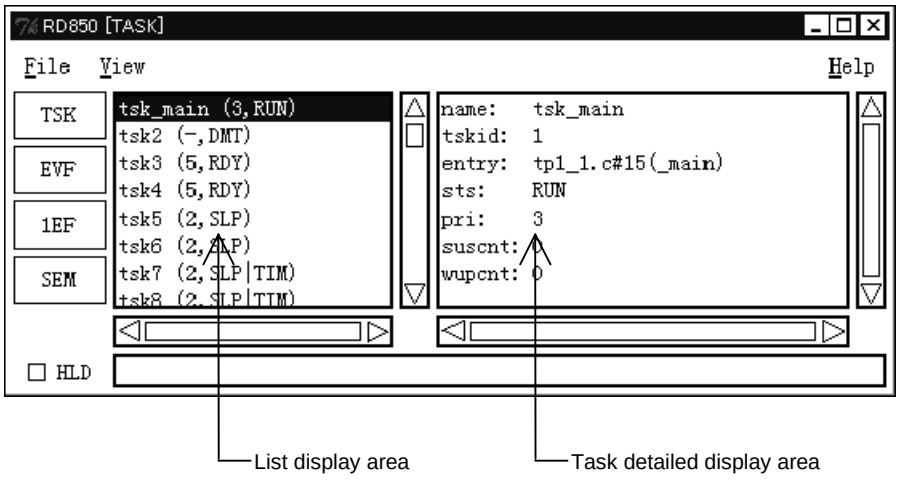


Contents	Opens the help file
About RD850	Shows the RD850 version information

3.7 Task Window

3.7.1 Task information display

Figure 3-4. Task Information Display



Tables 3-2 to 3-5 show the information shown in the list display area and the task detailed display area.

Table 3-2. Display Contents of List Display Area

Item		Contents
List display area	1st item	Task name
	2nd item	Current task priority (displays "—" when the task status is DMT, WTX, WTX | SUS)
	3rd item	Task status

Remark Tasks are shown in the order of the ID number in the list display area.

Table 3-3. Display Contents of Task Detailed Display Area

Label	Contents
name	Task name
tskid	Task ID
entry	Task start address If there is debug information: File name # line number (symbol) If there is a symbol: Symbol If there is no symbol: Address
sts	Status
pri	Priority
suscnt	Suspend count
wupcnt	Startup request count
pc	Current PC
stkptr	Stack pointer

The statuses of the tasks shown in the list display area and task detailed display area are as follows.

Table 3-4. Tasks Displayed in List Display Area and Task Detailed Display Area

Display	Meaning
RUN	Execution status
RDY	Execution enabled status
DMT	Halt status
SUS	Suspend status
WTX	Task execution right wait status
SLP	Startup wait status
DLY	Time limit wait status
EVF	Event flag wait status
1EF	1-bit event flag wait status
SEM	Semaphore wait status
MBX	Message wait status
MPF	Fixed length memory block wait status
MPL	Variable length memory block wait status

If the task is in the wait status, information additional to the status is displayed.

Table 3-5. Additional Task Information

Display	Meaning
TIM	Wait status with time limit

There may be several of the above-described task statuses. In this case, these statuses are displayed separated by "|".

Moreover, if tasks have resources (event flag, 1-bit event flag, semaphore, mailbox, fixed length memory pool, variable length memory pool), the names of these resources are displayed in addition to the status.

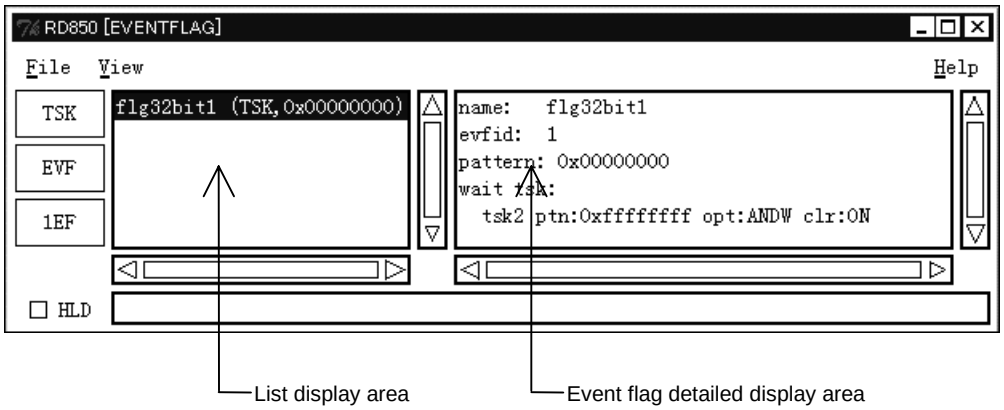
3.7.2 Task source display

By double clicking the **entry** and **pc** lines in the task detailed display area, the Source window of the debugger is opened if there is debug information, and the Assembler window of the debugger is opened if there is no debug information.

3.8 Event Flag Window

3.8.1 Event flag information display

Figure 3-5. Event Flag Information Display



Tables 3-6 to 3-8 show the information displayed in the list display area and event flag detailed display area.

Table 3-6. Display Contents of List Display Area

Item		Contents
List display area	1st item	Event flag name
	2nd item	Existence of wait task (TSK: Wait task, NON: No wait task)
	3rd item	Current bit pattern

Table 3-7. Display Contents of Event Flag Detailed Display Area

Label	Contents
name	Event flag name
evfid	Event flag ID
pattern	Current bit pattern

If a task with an event flag exists, the following information is displayed.

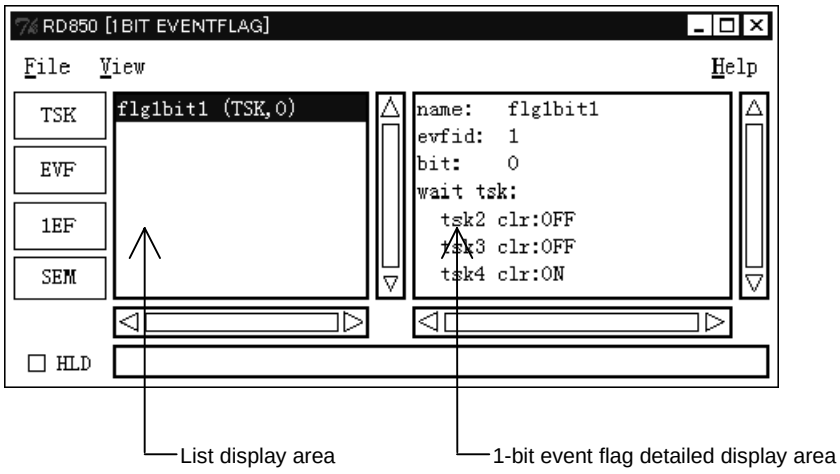
Table 3-8. Display of Event Flag Wait Tasks

Label	Contents	
wait tsk	Wait task name	
	ptn	Wait pattern
	opt	Wait option (TWF_ORW: OR wait, TWF_ANDW: AND wait)
	clr	Existence of clear specification (ON: Clear specification, OFF: No clear specification)

3.9 1-Bit Event Flag Window

3.9.1 1-bit event flag information display

Figure 3-6. 1-Bit Event Flag Information Display



Tables 3-9 to 3-11 show the information displayed in the list display area and 1-bit event flag detailed display area.

Table 3-9. Display Contents of List Display Area

Item		Contents
List display area	1st item	1-bit event flag name
	2nd item	Existence of wait task (TSK: Wait task, NON: No wait task)
	3rd item	Current bit pattern

Table 3-10. Display Contents of 1-Bit Event Flag Detailed Display Area

Label	Contents
name	1-bit event flag name
evfid	1-bit event flag ID
bit	Current bit

If there is a task that waits for a 1-bit event flag, the following information is displayed.

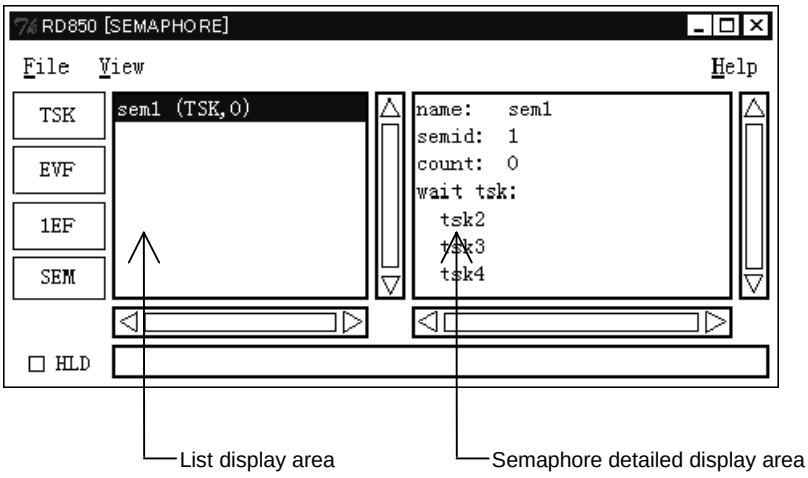
Table 3-11. Display of 1-Bit Event Flag Wait Task

Label	Contents	
wait tsk	Wait task name	
	clr	Existence of clear specification (ON: Clear specification, OFF: No clear specification)

3.10 Semaphore Window

3.10.1 Semaphore information display

Figure 3-7. Semaphore Information Display



Tables 3-12 to 3-14 show the information displayed in the list display area and semaphore display area.

Table 3-12. Display Contents of List Display Area

Item		Contents
List display area	1st item	Semaphore name
	2nd item	Existence of wait task (TSK: Wait task, NON: No wait task)
	3rd item	Current resource count

Table 3-13. Display Contents of Semaphore Detailed Display Area

Label	Contents
name	Semaphore name
semid	Semaphore ID
count	Current resource count

If there is a task that waits for a semaphore, the following information is displayed.

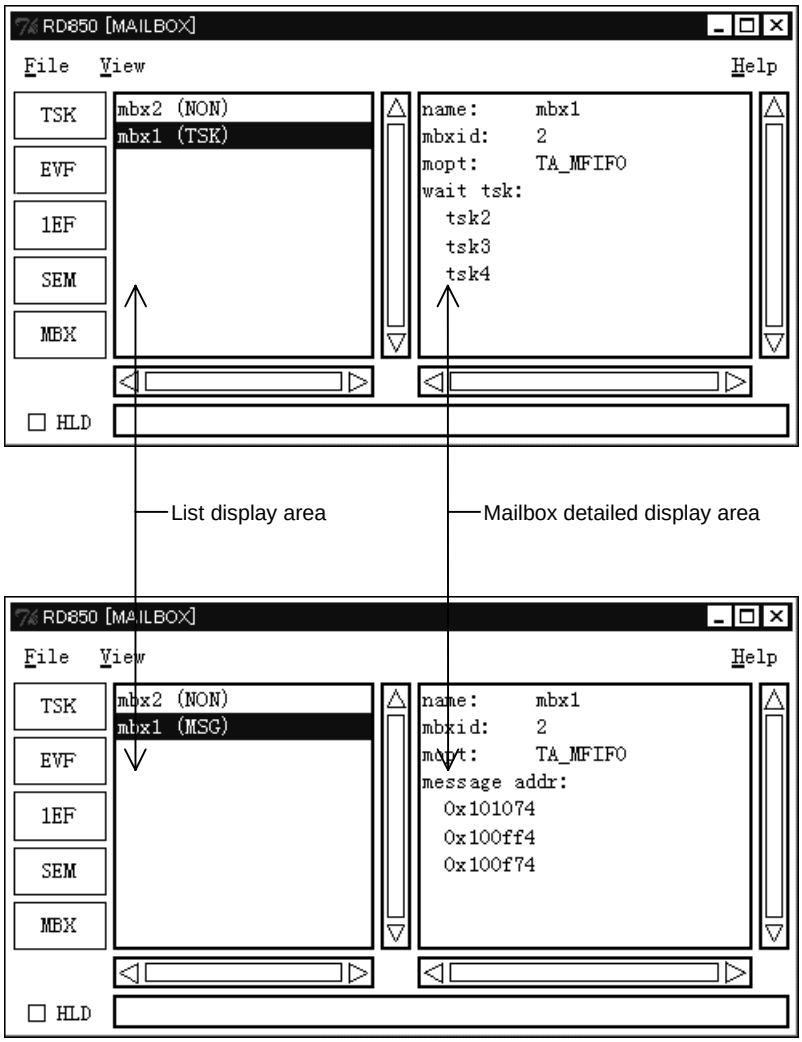
Table 3-14. Semaphore Wait Task Display

Label	Contents
wait tsk	Wait task name

3.11 Mailbox Window

3.11.1 Mailbox information display

Figure 3-8. Mailbox Information Display



Tables 3-15 to 3-18 show the information displayed in the list display area and mailbox detailed display area.

Table 3-15. Display Contents of List Display Area

Item		Contents
List display area	1st item	Mailbox name
	2nd item	Existence of wait task (TKS: Wait task, MSG: Receive wait message, NON: No wait task, no receive wait message)

Table 3-16. Display Contents of Mailbox Detailed Display Area

Label	Contents
name	Mailbox name
mbxid	Mailbox ID
mopt	Message queuing format (TA_MFIFO: FIFO order/TA_MPRI: Priority order)

If a task waiting for a message exists, the following information is displayed.

Table 3-17. Message Wait Task Display

Label	Contents
wait tsk	Wait task name

If a message exists, the following information is displayed.

Table 3-18. Information when Messages Exist

Label	Contents
message	Message address

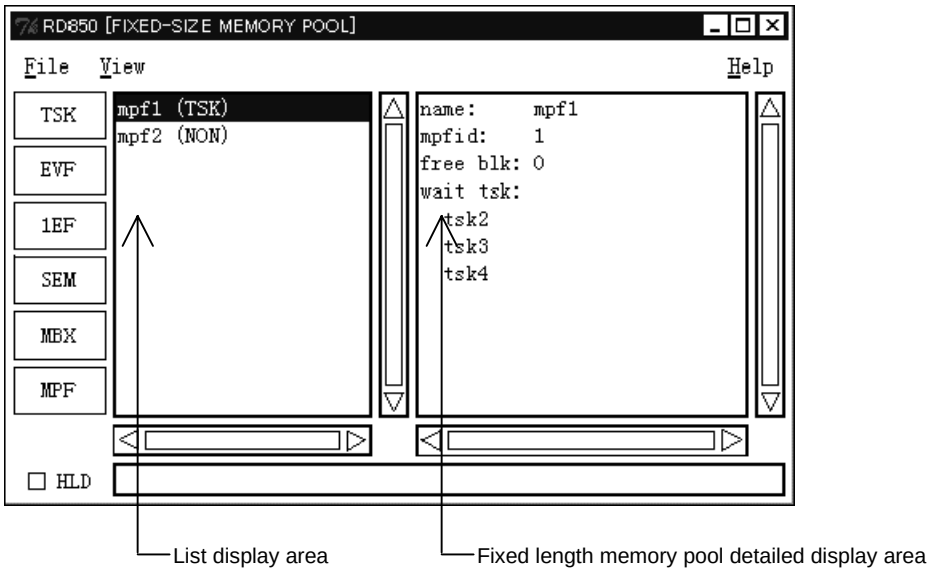
3.11.2 Message memory display

The debugger's Memory window can be opened by double clicking the **message** line of the mailbox detailed display area.

3.12 Fixed Length Memory Pool Window

3.12.1 Fixed Length Memory Pool Information Display

Figure 3-9. Fixed Length Memory Pool Information Display



Tables 3-19 to 3-21 show the information displayed in the list display area and fixed length memory pool detailed display area.

Table 3-19. Display Contents of List Display Area

Item		Contents
List display area	1st item	Fixed length memory pool name
	2nd item	Existence of wait task (TSK: Wait task, NON: No wait task)

Table 3-20. Display Contents of Fixed Length Memory Pool Detailed Display Area

Label	Contents
name	Fixed length memory pool name
mpfid	Fixed length memory pool ID
free blk	Free memory block count

If there is a task that waits for a memory block, the following information is displayed.

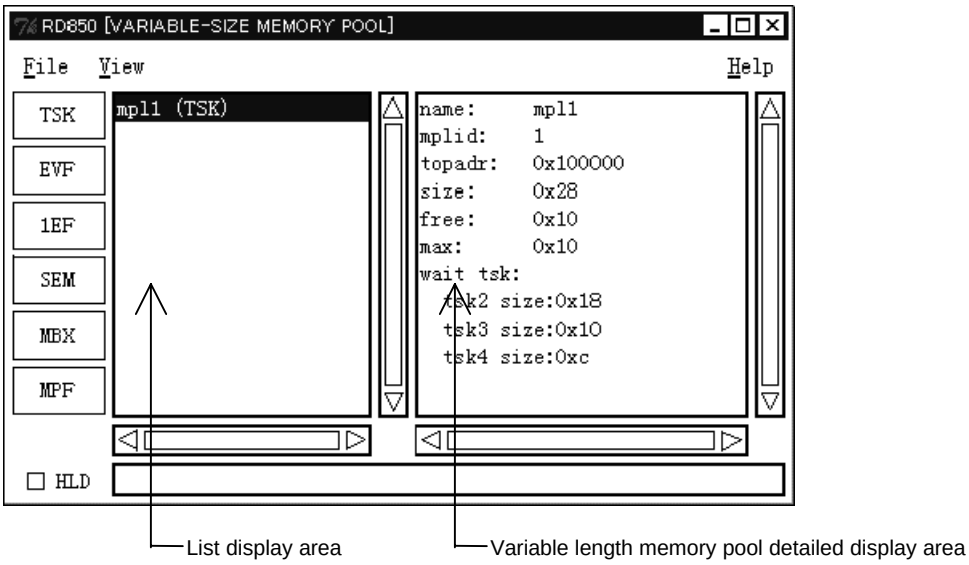
Table 3-21. Memory Block Wait Task Display

Label	Contents
wait tsk	Wait task name

3.13 Variable Length Memory Pool Window

3.13.1 Variable length memory pool information display

Figure 3-10. Variable Length Memory Pool Detailed Display



Tables 3-22 to 3-24 show the information displayed in the list display area and variable length memory pool detailed display area.

Table 3-22. Display Contents of List Display Area

Item		Contents
List display area	1st item	Variable length memory pool name
	2nd item	Existence of wait task (TSK: Wait task, NON: No wait task)

Table 3-23. Display Contents of Variable Length Memory Pool Detailed Display Area

Label	Contents
name	Variable length memory pool name
mplid	Variable length memory pool ID
topadr	Memory pool start address
size	Memory pool size (Unit: byte)
free	Total free memory size (Unit: byte)
max	Maximum securable memory block size (Unit: byte)

If there is a task that waits for a memory block, the following information is displayed.

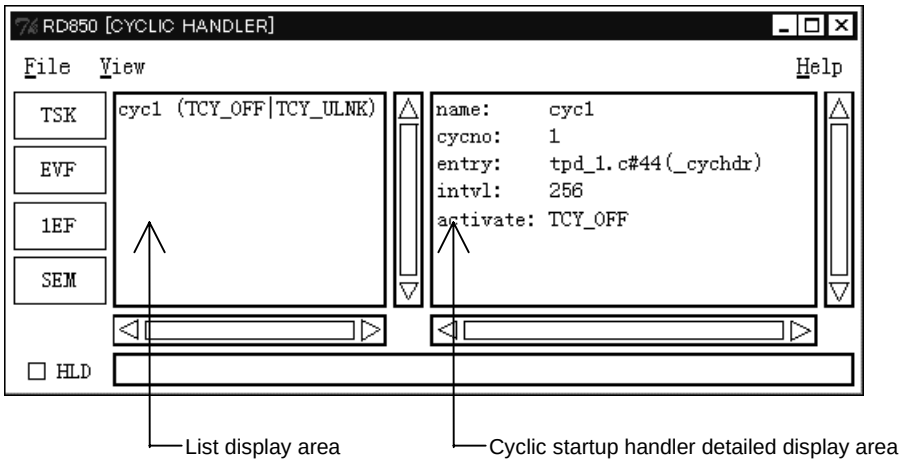
Table 3-24. Memory Block Wait Task Display

Label	Contents	
wait tsk	Wait task name	
	size	Wait block size (Unit: byte) (The value that is the result of adding the 4 bytes required by the OS is displayed upon request with a system call)

3.14 Cyclic Startup Handler Window

3.14.1 Cyclic startup handler information display

Figure 3-11. Cyclic Startup Handler Information Display



Tables 3-25 to 3-27 show the information displayed in the list display area and cyclic startup handler detailed display area.

Table 3-25. Display Contents of List Display Area

Item		Contents
List display area	1st item	Cyclic startup handler name
	2nd item	Activation status (TCY_ON, TCY_OFF, TCY_ULNK)

Table 3-26. Display Contents of Cyclic Startup Handler Detailed Display Area

Label	Contents
name	Cyclic startup handler name
cycno	Cyclic startup handler number
entry	Cyclic startup handler start address If there is debug information: File name # line number (symbol) If there is a symbol: Symbol If there is no symbol: Address
intvl	Cyclic startup interval
activate	Activation status

The activation statuses of the list display area and cyclic startup handler detailed display area are as follows.

Table 3-27. Activation Statuses of List Display Area and Cyclic Startup Handler Detailed Display Area

Display	Contents
TCY_ON	Started-up status
TCY_OFF	Not started-up status
TCY_ULNK	TCY_OFF status and removed from timer queue

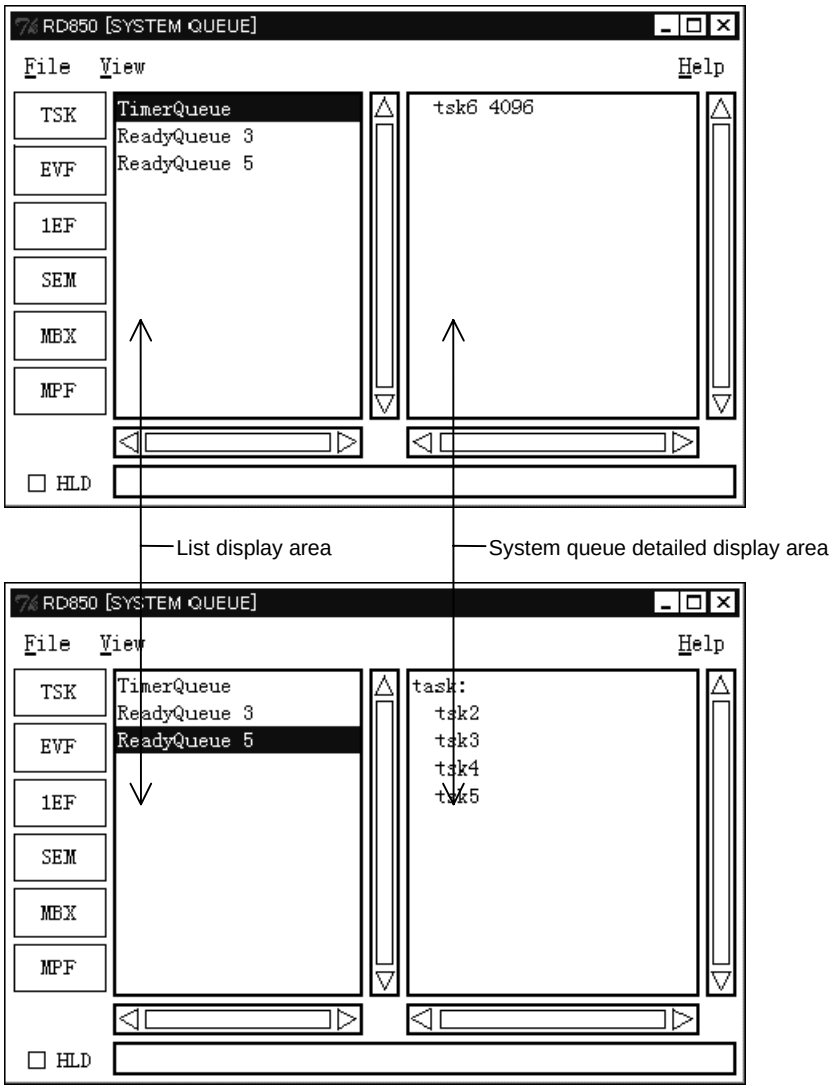
3.14.2 Cyclic startup handler source display

By double clicking the **entry** line in the cyclic startup handler detailed display area, the Source window of the debugger is opened if there is debug information, and the Assembler window of the debugger is opened if there is no debug information.

3.15 System Queue Window

3.15.1 System queue information display

Figure 3-12. System Queue Information Display



The system queue information display shows the timer queue and ready queue information.

Tables 3-28 to 3-30 show the information displayed in the list display area and system queue detailed display area.

Table 3-28. Display Contents of List Display Area

Item		Contents
List display area	1st item	System queue name (TimerQueue/ReadyQueue)
	2nd item	Priority (None in the case of timer queue)

Table 3-29. Display Contents of System Queue Detailed Display Area (Timer Queue Display)

Label	Contents
None	Cyclic startup handler name/task name wait block count

Table 3-30. Display Contents of System Queue Detailed Display Area (Ready Queue Display)

Label	Contents
task	Task name

[MEMO]

CHAPTER 4 ERROR MESSAGES

The description of error messages is done in the following format.

Error No.	The error number.
Error message	Message that is output
Error contents	The contents of the message that is output

The error messages are listed below.

Error No.	1000
Error message	Not connect.
Error contents	Displayed when the debugger is not connected. Start up the debugger.
Error No.	1100
Error message	Debugger running.
Error contents	Displayed when the display resources are changed or a status is changed when the status is not the break status. Operation when in the break status.
Error No.	1200
Error message	Maybe RX not loaded..
Error contents	RX is not loaded. Load RX.
Error No.	1300
Error message	Interrupt Disabled.
Error contents	The status cannot be changed because the system is in the interrupt disabled status. Retry after setting the interrupt enable status.

[MEMO]

CHAPTER 5 CAUTIONS

This chapter describes cautions that apply to debugging a load module incorporating the RX850, using the ID850 integrated debugger (including the RD850).

5.1 Next-Step Execution

When debugging a load module that incorporates the RX850, observe sthe following three points when executing the next step.

(1) Do not next-step execute the ext_tsk.

Tasks which are next-step executed (hereafter known as target tasks) simply terminate, and no break occurs.

Even if a break occurs, it may occur during processing after sta_tsk is issued for the next target task (or a task sharing a task with the target task).

Even if no break has occurred, it may occur by selecting **"Execute(X) → Stop"** or **"Execute → Stop"** in the menu bar in the main window.

(2) Be careful with next-step execution of tasks for which ter_tsk can be performed.

If ter_tsk is performed during next-step execution, the target task simply terminates and no break occurs.

Even if a break occurs, it may occur during processing after sta_tsk is issued for the next target task (or a task sharing a task with the target task).

Even if no break has occurred, a break may occur by selecting **"Execute(X) → Stop"** or **"Execute → Stop"** in the menu bar in the main window.

(3) Next-step execution may not function appropriately during RX processing.

A break may occur inside a subroutine.

5.2 Reserved Words

Symbols reserved by the RX850 and RD850 are listed below.

5.2.1 RX definition symbols

The RX and RX configurators are defined as external symbols, and are referenced by the RD850.

RX850*
Sit*
SysIntEnt
RX system call name

5.2.2 Cautions on program creation for RD850 users

To realize useful debugging functions using the RX850 for the RD850, the RX850 and RD850 have reserved symbols (see section **5.2.1 RX definition symbols**).

Using symbols that have the same name as these reserved symbols will interfere with the debugging functions of the RD850.

Do not use the reserved symbols of the RX and RD850 in user programs.

[MEMO]

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APPENDIX B REVISION HISTORY

A history of the revisions up to this edition is shown below. “Applied to:” indicates the chapters to which the revision was applied.

Edition	Contents	Applied to:
Second edition	Addition of target OS to operating environment host machine	**CHAPTER 1 GENERAL**
	Modification of explanation for installation method	**CHAPTER 2 INSTALLATION AND STARTUP**
	Modification of explanation for directory configuration	
	Modification of directory configuration diagram	

[MEMO]

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